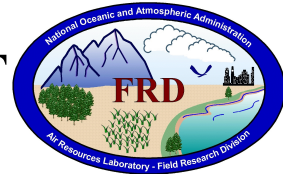


# FRD ACTIVITIES REPORT

## March 2007



### Research Programs

#### *UrbaNet*

Some preliminary work related to developing urban Model Output Statistics (urban MOS) was completed in March. The intention is to provide improved wind forecasts in urban areas by combining model outputs and local observations in a MOS regression approach. The NCEP Rapid Update Cycle (RUC) appears most suitable for this effort, because it is reinitialized every hour based on the latest observations. Archived RUC output is available from the NOAA National Operational Model Archive & Distribution System (NOMADS). It is hoped that the model output can be combined with urban observations (including private network data) to significantly enhance the skill of short-range urban forecasts. (Richard Eckman, 208-526-2740, and Ron Dobosy, ATDD)

#### *ET Probe*

Page proofs are expected shortly for the ET probe paper that will appear in the *Journal of Atmospheric and Oceanic Technology*. Also, this paper is now listed in the "Papers to Appear" section (Web PTA) at the American Meteorological Society web site.

Drs. John Gaynor (OAR) and Emil Simiu (NIST) recently submitted a manuscript on the NIST-NOAA Resilient Communities Cooperative Initiative to the Marine Technology Society Journal. This initiative includes research related to wind damage caused by hurricanes. The ET probe is discussed in the manuscript, and a photograph of a probe deployed in Hurricane Ivan (2004) is included in the current draft. (Richard Eckman, 208-526-2740)

#### *Perfluorocarbon Tracer Analysis Development*

The long-term Perfluorocarbon (PFC) sample stability (aging) tests for low (250 pptv), middle (4,000 pptv), and high (100,000 pptv) concentrations are still in progress. Each set of cartridges have been analyzed over periods of several weeks and indications are that the concentrations in the sample bags are maintaining their original concentrations. These will continue to be analyzed intermittently over the next several months to complete this particular study. A variety of cleaning tests were in progress to determine the best way to handle the PFC contamination artifact that has been identified with respect to the holding of high concentrations (100,000 pptv) in the PIGS sampling system. Among the tentative conclusions are (1) that there appears to be a contamination artifact associated with both the rubber tubing as well as the Tedlar sample bags themselves although the tubing artifact is dominant; (2) the magnitude of the artifact is correlated with the volatility of the PFC species (less artifact associated with higher volatility); (3) a very long and/or repeated cleaning cycle slightly reduces but does not eliminate the artifact; (4) the

artifact appears to be almost completely eliminated if the bags are cleaned in the standard way, filled with clean gas, allowed to sit for a week, and then cleaned again in the standard way; and (5) the artifact appears to be significantly less when the initial concentration level is less (~ 20,000-40,000 pptv). (Dennis Finn, 208-526-0566, and Roger Carter)

### ***PIGS Upgrade***

As part of our continuing effort to improve our tracer sampling and analysis capability, the firmware in the handheld computer used to program the tracer samplers was upgraded so it would properly record the field blank and field control samples. These samples are part of the field quality control program used in all our tracer experiments. The valve upgrade on the automated tracer analyzers was also completed and upgrades were installed on both the firmware in the analyzers and the software used to analyze the individual chromatograms. (Roger Carter, 208-526-2745)

### **Cooperative Research with DOE NE-ID (Idaho National Laboratory)**

#### ***Emergency Operations Center (EOC)***

A requalification drill for Team A was held at the EOC on 6 March. The drill scenario involved a fire, explosion, and possible release of a chemical from an INL scientific research laboratory in Idaho Falls. The team provided meteorological support and ran the FRD transport and dispersion model to help make evacuation recommendations during the drill. Everything went smoothly during the drill. (Jason Rich, 208-356-9108 and Brad Reese)

#### ***Boundary Layer Profiler Quality Control***

In the past, the data collected by the 915 MHz radar profiler located on the INL has had quality control checks performed at the end of each month. Although these checks have been available for climatological studies, they were not available in the real time database for use by models, analysis tools, and software that displayed the real time profiler data. We have now implemented an automated system that runs the quality control software as the data is collected every 30 minutes and places the quality control flags in the real-time database with the profiler data. Hopefully, having these flags available will increase the utility of the data. (Roger Carter 208-526-2745, Neil Hukari, and Brad Reese)

#### ***Mesoscale Modeling***

An automated system to generate WRF model forecasts for Southeast Idaho is nearing completion. The current setup uses a 20 km coarse grid and a 4 km nested grid for the region surrounding INL. WRF is being initialized with output from the NCEP Rapid Update Cycle (RUC) model. Every three hours, the FRD automated system will download the RUC 12-hour forecast and then run the higher resolution WRF model. At first, the intention was to run a WRF “cold start” only once per day. Later runs would be restarts based on the previous run. This limits the effect of spin-up issues during cold starts. However, the problem with this approach is

that the only changes during the restarts are on the lateral boundary conditions of the coarse grid. Changes at these lateral boundaries can take quite a while to percolate into the grid interiors, so effectively the daily WRF runs are mostly determined by the RUC forecast used in the cold start. In the current configuration, every WRF run is a cold start. This takes maximum advantage of the RUC data assimilation. There may be more problems with spin-up, but so far this does not appear to be significant.

Graphics from the WRF runs are being generated using the NCAR Command Language (NCL). These are initially generated as high-quality Postscript images that are then converted into bitmap images for display over the web. An NCL add-on library (WRF\_NCL) has already been developed for WRF output, and this library provides many useful tools for accessing and displaying the model output. (Richard Eckman, 208-526-2740)

## Other Activities

### *One NOAA in Idaho*

FRD joined forces with the Pocatello National Weather Service (NWS) at the SE Idaho Spring Fair on 29 March to celebrate 200 years of NOAA scientific research and discovery (Fig. 1). A public outreach booth was setup at the fair to provide safety tips on weather events and also to showcase weather instrumentation. The NWS utilizes data from the NOAA/INL Mesonet, operated by FRD, to position frontal boundaries, thunderstorm outflow boundaries, and for verification of their warnings. The cooperation between the two NOAA units has been ongoing for several years and is a connection NOAA is just now beginning to foster under its “One NOAA” slogan.



Figure 1. FRD personnel joined with the staff from the Pocatello National Weather Service to celebrate 200 years of NOAA scientific research and discovery at the SE Idaho Spring Fair on 29 March.

## ***Outreach***

This month the Cub Scouts of America focused on weather for the activity focus. Cub Scout Pack #440 from Idaho Falls took a tour of the Field Research Division office on 8 March. They learned about basic weather measurements as well as the different research activities of FRD. In addition, a presentation on weather was given at the Pack meeting of Blackfoot Cub Scout Pack #212 on 22 March. The presentation focused on lightning safety and the 30-30 rule. (Jason Rich, 208-526-9513, and Kirk Clawson, 208-526-2742)

A short seminar was given to students involved in a balloon research project at the University of Idaho. The seminar consisted of a PowerPoint presentation about the NOAA smart balloon design and capabilities with time for questions and answers. (Randy Johnson, 208-526-2129)

## ***Papers***

Warner, T., P. Benda, S. Swerdlin, J. Knievel, E. Argenta, B. Aronian, B. Balsley, J. Bowers, **R. Carter**, P. A. Clark, **K. L. Clawson**, J. Copeland, A. Crook, R. Frehlich, M. L. Jensen, Y. Liu, S. Mayor, Y. Meillier, B. Morley, R. Sharman, S. Spuler, D. Storwold, J. Sun, J. Weil, M. Xu, A. Yates, Y. Zhang, 2007: The Pentagon Shield Field Program: Toward critical Infrastructure Protection. *Bulletin American Meteorology Society*. Volume 88, Number 2 pp. 167-176.

**Clawson, K.L., R.G. Carter, D.J. Lacroix, J.D. Rich, N.F. Hukari, R.C. Johnson, and T. Strong**, 2007: Midtown Manhattan 2005 (MID05) SF<sub>6</sub> Atmospheric Tracer Field Tests. NOAA Technical Memorandum OAR ARL-258, Air Resources Laboratory, Idaho Falls, Idaho.

Doran, J.C., K.J. Allwine, J.E. Flaherty, **K.L. Clawson**, and **R.G. Carter**, 2007: Characteristics of Puff Dispersion in an Urban Environment, *Atmosphere Environment*. Volume 41, Issue 16, pp. 3440-3452. (In press)

Edson, J., **T. Crawford, J. Crescenti**, T. Farrar, N. Frew, G. Gerbi, C. Helmis, T. Hristov, D. Khelif, A. Jessup, H. Jonsson, M. Li, L. Mahrt, W. McGillis, A. Plueddemann, L. Shen, E. Skillingstad, T. Stanton, P. Sullivan, J. Sun, J. Trowbridge, D. Vickers, S. Wang, Q. Wang, R. Weller, J. Wilkin, A.J. Williams III, D.K.P. Yue, and C. Zappa, 2007: The Coupled Boundary Layers and Air-Sea Transfer Experiment In Low Winds. *Bulletin American Meteorology Society*. Volume 88, Number 3, pp. 341-356 (In press)

P.G. Black, E.A. D'Asaro, W.M. Drennan, **J.R. French**, P.P. Niiler, T.B. Sanford, E.J. Terrill, E.J. Walsh, and J.A. Shang, 2007: Air-Sea Exchange In Hurricanes. *Bulletin American Meteorology Society*. Volume 88, Number 3, pp. 357-374 (In press)

**Eckman, R.M., R.J. Dobosy, D.L. Auble, T.W. Strong, T.L. Crawford**, 2007: A pressure-sphere anemometer for measuring turbulence and fluxes in hurricanes, *Journal of Atmospheric and Oceanic Technology*. (In press)

**Carter, R.G., N.F. Hukari, and J.D. Rich**, 2007: Identifying Natural Clusters in Eastern Idaho Wind Fields: A Practical Application of Cluster Analysis to Wind Forecasting. *Weather and Forecasting*. (ARL review)

### ***Safety***

All employees are being required to complete an on-line CPR training by May 1<sup>st</sup>. We have focused on CPR training and preparation of staff members for several years.

### ***Visitors***

Rick Dittmann, Meteorologist in Charge, and Vernon Preston, Warning Communications Meteorologist from the Pocatello National Weather visited FRD on March 6. The purpose of their visit was to better coordinate activities of interest to both groups.